DETAILED ACTION

1. Claims 1 - 33 are pending in this application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 12-14, and 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Blumrich et al. (Pre-Grant Publication No. US 2004/0103218 A1), hereinafter Blumrich.

4. With respect to claim 1, Blumrich discloses cluster management software comprising ([0025], lines 4-7): a plurality of cluster agents, each cluster agent associated with an HPC node including an integrated fabric ([0051], lines 1-14) and the cluster agent operable to determine a status of the associated HPC node ([0210], lines 4-9); and a cluster management engine communicably coupled with the plurality of the HPC nodes ([0226], lines 20-22, the kernel acts as the cluster engine) and operable to execute an HPC job using a dynamically allocated subset of the plurality of HPC nodes

based on the determined status of the plurality of HPC nodes ([0226], lines 20-22, using run-time library information to configure hardware is dynamic allocation).

5. As for claim 2, Blumrich discloses the cluster management engine further operable to determine a topology of the plurality of nodes ([0255], lines 1-5) based, at least in part, on the determined status of the HPC nodes ([0225], lines 1-10, the network determines the status of elements to decide if it favors another method).

6. As for claim 3, Blumrich discloses the topology comprising a three dimensional Torus ([0015], lines 1-5).

7. With respect to claim 12, Blumrich discloses a method for managing clusters comprising ([0025], lines 4-7): determining a status of a subset of a plurality of HPC nodes ([0210], lines 4-9) , each node comprising an integrated fabric ([0051], lines 1-14); and executing an HPC job using a dynamically allocated subset of the plurality of HPC nodes, the subset allocated based on the determined status ([0226], lines 20-22, using run-time library information to configure hardware is dynamic allocation).

8. As for claim 13, Blumrich discloses determining a topology of the plurality of nodes ([0255], lines 1-5) based, at least in part, on the determined status from the HPC nodes ([0255], lines 1-10, where the network favoring a configuration is based on status).

9. As for claim 14, Blumrich discloses the topology comprising a three dimensional torus ([0015], lines 1-5).

10. With respect to claim 23, Blumrich discloses a cluster management system comprising: a plurality of HPC nodes ([0025], lines 4-7), each node including an integrated fabric and operable to communicate a status ([0255], lines 1-10, where one of the networks favoring a setup uses status determination); and a management node communicably coupled with the plurality of the HPC nodes and operable to execute an HPC job using a dynamically allocated subset of the plurality of HPC nodes ([0226], lines 20-22).

11. As for claim 24, Blumrich discloses the management node further operable to determine a topology ([0255], lines 1-5) of the plurality of nodes based, at least in part, on receiving the determined status from the HPC nodes ([0255], lines 1-10).

12. As for claim 25, Blumrich discloses the topology comprising a three dimensional Torus ([0015], lines 1-5).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 4-5, 8-11, 15-16, 19-22, 26-27, and 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blumrich, as applied to claims 1, 12, and 23, in view of Allen et al. (The Cactus Worm: Experiments with Dynamic Resource Discovery and Allocation in a Grid Environment), hereinafter Allen.

15. As for claim 4, Blumrich teaches the cluster management engine further operable to dynamically allocate a virtual cluster in the plurality of HPC nodes. But Blumrich doesn't teach a virtual cluster nor does he teach a dynamically allocated subset for executing the HPC job comprising at least a subset of the virtual cluster. However, Allen teaches such a system (Introduction, lines 4-8). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teachings of Blumrich in order to utilize dynamic allocation of virtual clusters, as taught by Allen, in order to make an efficient system that can adjust to different size workloads without undue hardship.

16. As for claim 5, Blumrich teaches the cluster management engine further operable to: dynamically allocate a second subset of HPC nodes in the virtual cluster; and execute a second HPC job using the second subset ([0024], lines 1-7; [0028], lines 3-7, where parallel processing is the second subset of nodes).

17. As for claim 8, it is rejected on the same basis as claim 4 above. In addition, Blumrich teaches the cluster management engine further operable to dynamically allocate a second cluster in the plurality of HPC nodes ([0024], lines 1-7; [0028], lines 3-7, where parallel processing is the second subset of nodes). But Blumrich doesn't teach allocating virtual clusters. However, Allen does (Introduction, lines 4-8).

18. As for claim 9, Blumrich teaches the second virtual cluster comprising different HPC nodes from the first virtual cluster ([0028], lines 3-11).

19. As for claim 10, Blumrich teaches wherein the cluster management engine operable to execute the HPC job using the dynamically allocated subset comprises (see the rejection for claim 1) the cluster management engine operable to: receive a job request comprising at least one job parameter (in performing calculations, the process of receiving and carrying out a job is taking place); dynamically allocate the subset of the plurality of HPC nodes, and execute the HPC job using the dynamically allocated subset ([0226], lines 2-22). But Blumrich doesn't teach determine dimensions of the

HPC job based, at least in part, on the one or more job parameters or based at least in part, on the determined dimensions.

However, Allen does teach such a system (Introduction, lines 4-8, where changing based off of characteristics requires that dimensions are determined). It would have been obvious to a person of ordinary skill, in the art, at the time of the invention to modify the teachings of Blumrich in order to determine dimensions, as taught by Allen. Doing so provides a system that can better handle its workloads. Furthermore, determining dimensions or status would likely be used in dynamic allocation of any sort.

20. As for claim 11, it is rejected on the same basis as claim 10 above. In addition, Blumrich teaches the cluster management engine further operable to: select a policy ([0255], lines 1-15, where the Torus, global tree, etc are different policies) based on the job request; and dynamically determine the dimensions of the HPC job further based on the selected policy ([0226], lines 20-22).

21. As for claim 15, Blumrich doesn't teach dynamically allocating a virtual cluster in the plurality of HPC nodes, the dynamically allocated subset for executing the HPC job comprising at least a subset of the virtual cluster. However, Allen does teach dynamically allocating virtual clusters (Introduction, lines 4-8). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teachings of Blumrich in order to utilize dynamic allocation of virtual clusters, as taught

by Allen, in order to make an efficient system that can adjust to different size workloads without undue hardship.

22. As for claim 16, it is rejected on the same basis as claim 15 above. In addition, Blumrich teaches allocating a second subset ([0024], lines 1-7 and [0028], lines 3-7, where the parallel job processing is the second subset).

23. As for claim 19, it is rejected on the same basis as claim 15 above. In addition, Blumrich teaches dynamically allocating a second virtual cluster in the plurality of HPC nodes (([0024], lines 1-7; [0028], lines 3-7, where parallel processing is the second subset of nodes).

24. As for claim 20, it is rejected on the same basis as claim 19 above. In addition Blumrich teaches the second virtual cluster comprising different HPC nodes from the first virtual cluster ([0028], lines 3-11).

25. As for claim 21, Blumrich teaches wherein executing the HPC job using the dynamically allocated subset comprises (see the rejection for claim 1): receiving a job request comprising at least one job parameter; determining dimensions of the HPC job based, at least in part, on the one or more job parameters (in performing calculations, the process of receiving and carrying out a job is taking place); dynamically allocating the subset of the plurality of HPC nodes based and executing the HPC job using the

dynamically allocated subset ([0226], lines 2-22). But Blumrich doesn't teach determine dimensions of the HPC job based, at least in part, on the one or more job parameters or based at least in part, on the determined dimensions.

However, Allen does teach such a system (Introduction, lines 4-8, where changing based off of characteristics requires that dimensions are determined). It would have been obvious to a person of ordinary skill, in the art, at the time of the invention to modify the teachings of Blumrich in order to determine dimensions, as taught by Allen. Doing so provides a system that can better handle its workloads. Furthermore, determining dimensions or status would likely be used in dynamic allocation of any sort.

26. As for claim 22, it is rejected on the same basis as claim 21 above. In addition, Blumrich teaches selecting a policy based on the job request ([0255], lines 1-15, where the Torus, global tree, etc are different policies) based on the job request; and dynamically determine the dimensions of the HPC job further based on the selected policy ([0226], lines 20-22).

27. As for claim 26, Blumrich doesn't teach the management node further operable to dynamically allocate a virtual cluster in the plurality of HPC nodes, the dynamically allocated subset for executing the HPC job comprising at least a subset of the virtual cluster. However, Allen does teach dynamically allocating virtual clusters (Introduction, lines 4-8). It would have been obvious to a person of ordinary skill in the art at the time

of the invention to modify the teachings of Blumrich in order to utilize dynamic allocation of virtual clusters, as taught by Allen, in order to make an efficient system that can adjust to different size workloads without undue hardship.

28. As for claim 27, it is rejected on the same basis as claim 26 above. In addition, Blumrich teaches allocating a second subset ([0024], lines 1-7 and [0028], lines 3-7, where the parallel job processing is the second subset).

29. As for claim 30, it is rejected on the same basis as claim 26 above. In addition, Blumrich teaches the management node further operable to dynamically allocate a second virtual cluster in the plurality of HPC nodes (([0024], lines 1-7; [0028], lines 3-7, where parallel processing is the second subset of nodes).

30. As for claim 31, it is rejected on the same basis as claim 30 above. In addition Blumrich teaches the second virtual cluster comprising different HPC nodes from the first virtual cluster ([0028], lines 3-11).

31. As for claim 32, Blumrich discloses wherein the management node operable to execute the HPC job using the dynamically allocated subset ([0226], lines 20-22) comprises the management node operable to: receive a job request comprising at least one job parameter (in carrying out its calculations this step is taking place); dynamically allocate the subset of the plurality of HPC nodes ([0226], lines 20-22). But Blumrich

doesn't teach determine dimensions of the HPC job and being based, at least in part, on the determined dimensions.

However, Allen does teach such a system (Introduction, lines 4-8, where changing based of off the characteristics is determining dimensions). It would have been obvious to a person of ordinary skill, in the art, at the time of the invention to modify the teachings of Blumrich in order to determine dimensions, as taught by Allen. Doing so provides a system that can better handle its workloads. Furthermore, determining dimensions or status would likely be used in dynamic allocation of any sort.

32. As for claim 33, it is rejected on the same basis as claim 32 above. In addition, Blumrich teaches the management node further operable to: select a policy ([0255], lines 1-15, where the Torus, global tree, etc are different policies) based on the job request; and dynamically determine the dimensions of the HPC job further based on the selected policy ([0226], lines 20-22).

33. Claims 6-7, 17-18, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blumrich, in view of Allen, as applied to claims 4, 15, and 26, and in further view of Zircher et al. (Pre-Grant Publication No. US 2003/0217105 A1), hereinafter Zircher.

34. As for claim 6, it is rejected to on the same basis as claim 4 above. However, the combination of Blumrich and Allen does not teach the virtual cluster associated

with a user group. However, Zircher does teach such a system ([0097], lines 10-13, where the designated devices form the user groups). It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the teachings of Blumrich and Allen in order to utilize user groups, as taught by Zircher. Doing so greatly increases the autonomy of the HPCs use and allowing it to serve a higher volume of customer/clients.

35. As for claim 7, it is rejected on the same basis as claim 6 above. In addition, Zircher teaches the cluster management engine further operable to verify a user submitting the HPC job based, at least in part, on the user group ([0097], lines 10-13 and [0102], lines 1-2, in the process of utilizing the access control list, the verification of the user is taking place).

36. As for claim 17, the combination of Blumrich and Allen doesn't teach a virtual cluster associated with a user group. However, Zircher does teach such a system ([0097], Lines 10–13, where the designated devices form the user groups). It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the teachings of Blumrich and Allen in order to utilize user groups, as taught by Zircher. Doing so greatly increases the autonomy of the HPCs use and allowing it to serve a higher volume of customer/clients.

37. As for claim 18, it is rejected on the same basis as claim 17 above. In addition, Zircher teaches verifying a user submitting the HPC job based, at least in part, on the user group ([0097], lines 10-13 and [0102], lines 1-2, in the process of utilizing the access control list, the verification of the user is taking place).

38. As for claim 28, the combination of Blumrich and Allen doesn't teach a virtual cluster associated with a user group. However, Zircher does teach such a system ([0097], Lines 10–13, where the designated devices form the user groups). It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the teachings of Blumrich and Allen in order to utilize user groups, as taught by Zircher. Doing so greatly increases the autonomy of the HPCs use and allowing it to serve a higher volume of customer/clients.

39. As for claim 29, it is rejected on the same basis as claim 28 above. In addition, Zircher teaches the management node further operable to verify a user submitting the HPC job based, at least in part, on the user group ([0097], lines 10-13 and [0102], lines 1-2, in the process of utilizing the access control list, the verification of the user is taking place).

Conclusion

40. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH L. GREENE whose telephone number is

(571)270-3730. The examiner can normally be reached on Monday - Thursday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nabil El-Hady can be reached on (571) 272-3963. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLG

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